AN UNUSUAL TEXAS DUSTSTORM, MARCH 24–25, 1933

By MALCOLM C. HARRISON

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An unusual duststorm occurred over North and Central Texas on the night of March 24–25, 1933.

Dust and sandstorms often occur over West Texas, most frequently over the Panhandle and Llano Estacado, or Staked Plains,[1] where semiarid conditions exist, and also, but less often, over Central Texas. Pilots flying north or west out of Dallas are familiar with this phenomenon, and know what it is to fly through, go around, or even turn back and await the passing of, the storm. But every pilot who flew, or attempted to fly, through this particular duststorm reported his experience as unique.

The evening map of March 22 showed that a circular LOW was developing over Nevada. By the morning of the 24th it had moved east by slightly south with center just east of the Continental Divide and with axis elongated north and south. During the next 12 hours it moved rapidly east-southeast with trough lengthening and extending in a semi-arc from North Dakota southward through western Missouri and Southwest Texas into Mexico. By 7 a.m. (C.S.T.) of the 25th it had recurved rapidly northeastward and was centered over the Great Lakes, leaving the Southwest under the control of a Pacific HIGH.

No precipitation resulted from the movement of this LOW in those areas where the greatest supply of dust and sand is to be found, viz, Arizona, New Mexico, western Oklahoma, the western half of Texas, the northwest portion of East Texas, and other relatively dry regions of the far Southwest. A better meteorological condition could not exist for the formation of duststorms over North and West Texas and West and Central Oklahoma, especially at that season of the year.

The wind shift reached El Paso in extreme West Texas about 9 a.m., and Amarillo in the Panhandle about 11 a.m. Moving rapidly eastward, it reached Oklahoma City at 6 p.m. and Dallas at 8:40 p.m. of the 24th, attended by locally thick dust over its north portion and with thunderstorms along its entire front upon approaching the Dallas-Oklahoma City-Wichita airway. The wind shift itself caused only local puffs of dust in Texas (exclusive of the Panhandle). Stations reported visibilities of 8 to 15 miles and never less than 6 miles with the passing of the shift. The surface winds over the south portion of the shift were moderate while over the north portion they were strong. Within 6 to 8 hours after the passage of the wind shift, the surface winds, together with those in the low levels aloft, had veered from west and northwest to northeast, causing the ground visibilities to show the greatest decrease due to the settling of the dust from aloft.

There are three outstanding peculiarities of this duststorm; (*a*) Poor visibility aloft with good visibility at the surface, or ground; (*b*) whitish color of the dust, and (*c*) fineness of the dust. Although at various times the surface visibility decreased to 1 mile or less over the Panhandle and western Oklahoma, it never reached less than 7 miles from Dallas north to the Red River, and ranged from 4 to 10 miles (mostly 7 miles) from Dallas west to near the Guadalupe Pass in the mountains of extreme West Texas, followed by a visibility of 2 miles from Big Spring to Guadalupe Pass during the morning of the 25th. This is not in accord with conditions generally found in duststorms as the surface visibility usually is as poor as that aloft. At the 10 p.m. pilot-balloon ascension at Dallas the lantern was completely obscured within 4 minutes (altitude 2,600 feet above the ground), with a surface visibility of 10 miles; the next morning at the 5 a.m. ascension the lantern was obscured within 8 minutes (altitude, 5,000 feet), with a surface visibility of 8 miles.

Pilots reported this dust as being very fine and white in color, while ordinary duststorms over this area are composed of a heavy dust or sand of a yellowish or reddish-brown color. One pilot stated that the dust gave him a choking sensation and at times he was unable to read his instruments; another, enroute from Fort Worth to Dallas, flying at an altitude of 600 feet, had to search diligently for the Dallas airport, where the surface visibility was 10 miles. Other pilots were experiencing the same conditions elsewhere over North and Central Texas, all groping about more or less blindly, flying by instruments in a sea of white dust, with the stars dimly shining above and the ground stations reporting visibilities which seemed to belie the conditions aloft. One veteran pilot, who had previously made his customary call at the local Weather Bureau Office before departing on his flight, returned within a few hours and asked what was the matter with the weather. He was plainly baffled by this mysterious element, which he had failed to recognize as dust, due to its white color.

The experiences of two pilots on this night will be given somewhat in detail in order to bring out more clearly the conditions encountered—Pilot L. R. Wallace to the westward and Pilot E. C. Rockwood to the northward:

Pilot Wallace, flying the Dallas-El Paso section of the southern transcontinental airway, encountered the dust at the Pecos River near 6 p.m., while flying eastward out of El Paso. The dust gradually thickened in both density and depth, when Wallace pulled his ship up to an altitude of 9,000 feet where he flew all the way to Big Spring in order to avoid the dust which had a very irregular and ill-defined top near this elevation. From Big Spring to Abilene he flew through the dust at 1,500 feet with a visibility of 8 miles. On leaving Abilene, with Fort Worth-Dallas his next and final stop, he pulled up to an altitude of 4,000 feet where the top of the dust was definite and sharp. Out of Abilene the visibility became rapidly less with beacons visible 2 miles at an angle, and the lights of towns seen only when the ship was directly over them. However, it should be remembered that the pilot was looking downward through a layer of dust roughly a mile thick.

Within an hour the pilot had gone as far east as Ranger, circled three times over the dim lights of that town and, after requesting and receiving orders from the operations office of his company in Dallas via radio, he returned to Abilene. During this time the visibility aloft had decreased from 8 miles to, generally, from one-half to 1½ miles.

The west bound mail out of Dallas was entrained at Fort Worth, after Pilot J. H. Mangham was forced to return there after flying only a short distance on his way to El Paso. At 4 a.m. Pilot Wallace picked his mail up at Abilene and once more turned westward with Big Spring and El Paso his destination. This was after the eastbound mail had been entrained for Fort Worth-Dallas out of Abilene. On the westward trip the ship

[1] Region immediately south of and adjoining the Panhandle.

was flown at approximately 500 feet, taking advantage of moderate northeast winds, from Abilene to Guadalupe Pass, with the visibility averaging 2 miles, until reaching Guadalupe Field (20 miles east of Guadalupe Pass) where there was a change within 1 mile from a visibility of 2 miles to 60 miles north, south, and west. Guadalupe Field was reached just at dawn.

Pilot Rockwood, flying the Dallas-Kansas City section of the Dallas-Chicago route, departed from Dallas 11 p.m. with the surface visibility 10 miles, while at an altitude of 500 feet he found it to be less than 1½ miles. The base of the dust was fairly sharp at this elevation. Within 15 minutes he was forced back to Dallas after encountering an unusually heavy wave of dust which he described as a "white wall of something that looked like fog", and was within one-half mile of the Dallas airport before being able to see the lights from a height of 500 feet.

At 4 a.m. the following morning Pilot Rockwood again departed from Dallas in an endeavor to complete his schedule. He pulled up to an altitude of 1,000 feet flying in the dust, which had somewhat diminished, with a visibility of from 2 to 3 miles to Fort Worth. From Fort Worth to the Red River he flew at 800 feet with a visibility of about 2 miles but, after crossing the Red River Valley, it became unlimited within a distance of 3 miles. No definite base of the dust was noticed on this flight.

J. A. Riley points out [2] that one distinct type of Texas duststorm is caused by strong winds blowing across the plains of Texas, sometimes attaining gale force, over a wide area and picking up large quantities of dust. This would account for the duststorm under consideration except for the fact that the color and fineness of the dust, together with good surface visibility, would indicate that all, or practically all, of it originated somewhere to the west of Texas.

G. M. French, of the Weather Bureau Airport Station at Burbank, Calif., states that—

> there were two periods previous to the night of the 24th and 25th of March when strong to gale force surface winds occurred in many localities from eastern California to New Mexico including southern Nevada and southern Utah. One period was on the 21st and morning of 22nd and the other, more severe, on the 23rd.
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> There are a number of places in eastern California, the southern portions of Nevada and Utah, and in Arizona where dry lakes are composed of alkali, and during windy weather a fine white dust is picked up over these dry lakes.

It would seem from the foregoing that this dust was transported aloft by strong to gale force westerly winds after being picked up in small quantities over dry "alkali lakes" in the region between the Sierras and the southern Rockies and, after crossing the Rockies, more alkali was raised, by locally severe surface winds, from New Mexico and, eventually, upon reaching the Llano Estacado of Texas probably a last reinforcement of white alkali was received from the several dry alkali lakes in this area. As this dust was borne aloft into Central and North Texas (over descending topography, which would be a factor in maintaining good surface visibility) it was allowed gradually to descend to the ground with the veering of the surface winds, which, seemingly, grasped it from the overrunning dust-laden westerlies.

[2] Sandstorms in Texas, MONTHLY WEATHER REVIEW, January 1931, vol. 59, p. 30.

HAZE CONDITION AT NEW ORLEANS, LA., MAY 5–9, 1933

By GEORGE L. CANADAY
[Weather Bureau, New Orleans, La.]

The strange appearance of the sun and moon over New Orleans from May 5 to May 9, 1933, due to an unusually large amount of dust particles in the air, caused a great deal of interest among the residents of that city and resulted in the Weather Bureau answering numerous requests for an explanation of the phenomenon.

The sun, as well as the moon at night, assumed the appearance of a reddish disk. The reflected sunlight was of a mellow, golden color, particularly at dawn and in the late afternoon. Individuals were able to look directly at the rising or sinking sun, without injury to their eyes, the sun gleaming through the haze as a great red ball. At least one person was heard to confuse the setting sun with the moon, commenting on the enlarged appearance of the moon.

The Weather Bureau first observed a light haze over New Orleans during the night of May 5. The haze continued without a break until the night of May 9, varying from light to moderate and at times becoming almost dense. The gathering dust particles interecepted the shorter wave lengths of the sun's light and permitted the longer wave lengths to predominate in reaching the earth's surface, thereby causing the reddish glow of the sun and the golden sunlight.

Table 1, prepared from a typical upper-air map during the haze period, illustrates the strong westerly winds that prevailed. These high winds aloft probably were responsible for the unusual occurrence at New Orleans, having picked up the dust particles from more elevated, arid regions of the southwestern part of the United States and transported them eastward. The haze condition ended almost simultaneously with the shift of winds from a westerly to a more southerly direction.

TABLE 1.—*Winds aloft, May 5, 1933*
[Direction and velocity (m.p.s.)]

Station	Surface	1,000 M.	2,000 M.	3,000 M.
Albuquerque, N.Mex.	NW-2	WSW-4	W-7	
El Paso, Tex.	SW-9	W-16	NW-16	W-19
Big Springs, Tex.	S-1	WNW-3	WSW-12	W-20
Brownsville, Tex.	SW-1	SE-9	NW-2	SSW-15
Houston, Tex.	NW-1	WSW-10	WSW-11	W-22
Dallas, Tex.	W-7	WNW-10	WNW-12	W-14
Jackson, Miss.	SW-4	SW-8	W-18	W-29
New Orleans, La.	SE-1	SW-8	NW-18	WSW-29

While cloudiness at New Orleans was somewhat above normal and rainfall deficient, consistent breaks in the clouds permitted a considerable amount of the peculiar sunlight to come through. These circumstances favored closer observance of the haze effects, which were more pronounced in the early morning and late afternoon. Table 2 gives a history of the cloud conditions, rainfall amounts, and sunshine percentages during the existence of the haze over New Orleans.

TABLE 2.—*Cloudiness, precipitation, and sunshine at New Orleans*

Date	7 a.m.	Noon	7 p.m.	Precipitation	Percent sunshine
May 4	10 St. Cu. SE.	9 St. Cu. SE.	10 St. Cu. S.	T	28
5	Few Ci. St. W.	8 A. Cu. SW.	Few A. Cu. SW.	T	98
6	10 St. E.	6 A. St. W.	2 A. St. SW.	T	47
	10 Lt. Fog E.	4 St. Cu. SE.	8 St. Cu. SE.		
7	1 A. St. W.	10 St. Cu. SW.	9 A. St. SW.	0	77
	2 St. Cu. S.		1 St. Cu. SW.		
8	6 A. St. W.	4 A. St. W.	10 A. St. SW.	0	58
	4 St. Cu. SW.	6 St. Cu. SW.			
9	9 A. St. SW.	8 A. St. SW.	7 A. St. SW.	0	80
	1 Cu. S.	2 St. Cu. SW.	3 St. Cu. S.		
10	2 Cu. S.	2 Cu. S.	3 A. Cu. S.	0	88
			1 Cu. SE.		